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Bamboo Beating Bandits: Conflict, Inequality, and Vulnerability in the Political Ecology of Climate Change Adaptation in Bangladesh

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SUMMARY

Bangladesh contributes little to global greenhouse gas emissions, yet it is one of the countries most vulnerable to climate change. Based on semi-structured research interviews as a conduit to a literature review, this paper shows how the processes of enclosure, exclusion, encroachment, and entrenchment impede the vitality of its climate change adaptation efforts. Enclosure refers to when adaptation projects transfer public assets into private hands or expand the roles of private actors into the public sphere. Exclusion refers to when adaptation projects limit access to resources or marginalize particular stakeholders in decision-making activities. Encroachment refers to when adaptation projects intrude on biodiversity areas or contribute to other forms of environmental degradation. Entrenchment refers to when adaptation projects aggravate the disempowerment of women and minorities, or worsen concentrations of wealth and income inequality within a community. In the case of Bangladeshi, climate change policies implemented under the country's National Adaptation Program of Action have enabled elites to capture land through public servants, the military, and even gangs carrying bamboo sticks. Exclusionary forms of adaptation planning exist at both the national and local scales. Climate protection measures have encroached upon village property, *char* (public) land, forests, farms, and other public commons. Most egregiously, community coping strategies for climate change have entrenched class and ethnic hierarchies ultimately trapping the poor, powerless, and displaced into a predatory patronage system that can aggravate human insecurity and intensify violent conflict. Planners and practitioners of adaptation need to become more cognizant of the potential for projects to harm others, or admit complicity in the processes of enclosure, exclusion, encroachment, and entrenchment, if they are ever to be eliminated.

1. Introduction

Climate change adaptation refers to altering infrastructure, institutions, or ecosystems to respond to the impacts of climate change. It has been recognized as necessary to the political and economic survival of least developed countries such as Bangladesh (Ali, 1996, 1999; Huq & Asaduzzaman, 2010). Because Bangladesh sits at the intersection of three major river basins, and features flat deltaic topography with low elevation, it is prone to a multitude of climate-related events such as floods, droughts, tropical cyclones and storm surges. Fifteen percent of its 162 million people live within one-meter elevation from high tide (Richard, 2007), and annual floods inundate between 20% and 70% of the country's landmass each year (Mirza, 2002). Bangladesh has high population density and rates of poverty. It is the seventh most populous country in the world, with a density greater than one thousand persons per square kilometer (Rawlani & Sovacool, 2011). Bangladesh also has extreme climate variability, naturally alternating between seasons of monsoon and winter drought, and the nation is dependent upon crop agriculture, which is highly sensitive to changes in climate (Ahmed, 2006).

However, based on a mix of original interviews and a literature review, this article documents the detrimental presence of enclosure, exclusion, encroachment, and entrenchment in Bangladeshi climate change adaptation efforts. Climate change policies have enabled rural and urban elites to capture land. Exclusionary forms of adaptation planning and implementation exist at national and local scales. Climate protection measures have led to encroachment

Abbreviations: BWDB, Bangladesh Water Development Board; CDS, Coastal Development Strategy; GBM, Ganges, Brahmaputra, Meghna river basins; GHG, greenhouse gas; MOEF, Ministry of Environment and Forests; NAPA, National Adaptation Program of Action; UNFCCC, United Nations Framework Convention on Climate Change.

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upon the public commons. Finally, community coping strategies for climate change have, at times, entrenched existing class and ethnic hierarchies that trap the poor, powerless, and displaced into a nefarious system of patronage that only accelerates human insecurity and perpetuates violent conflict.

In unveiling the so-called political ecology of climate adaptation in Bangladesh, the paper aims to make three contributions. First, it emphasizes the politics of adaptation in *practice*. It moves beyond vulnerability mapping to assess the effects of current adaptation efforts. Much policy research related to adaptation centers on providing credible estimates of adaptation costs, or conducting vulnerability assessments, or trying to guide future adaptation strategies at the sectoral or national level. Instead, this article investigates the empirical economic, political, ecological, and social effects of adaptation efforts. The paper shows how the political ecology of adaptation, namely the processes of enclosure, exclusion, encroachment, and entrenchment, can distort the goals and effects of adaptation projects. Adaptation projects can become a flashpoint for competing interests, generating their own sets of winners and losers—even when they might produce a net social gain (Sovacool & Linnér, 2015). Many of these conflicts involve those seeking to enclose agendas or exclude stakeholders from access (Eriksen, Nightingale, & Eakin, 2015). In some situations, adaptation projects encroach upon and subvert the intended goals of wildlife conservation, or entrench disparities in wealth and development. Therefore, the study shows that adaptation should be reconceived as a political, deliberative challenge involving the satisfaction of competing preferences, as well as a social dilemma pitting, at times, the climatic and development goals of improved resilience against the pressing needs of marginalized and vulnerable populations.

Second, the article seeks to refine a more systematic and holistic *conceptual framework* for assessing adaptation. Most work on the political economy or ecology aspects of adaptation have tended to focus on seven distinct themes. Some such as Sweeney, Dobson, Despota, and Zinnbauer (2011), Schreurs and Tiberghien (2007), and Michaelowa (2000) explore corruption in climate change adaptation projects and the politics of lobbying. The IPCC (2012) and Barnett and O'Neil (2010) analyze maladaptation, where adaptation projects unintentionally lower resilience or increase greenhouse gas (GHG) emissions. Ruhl (2012) studies the winners and losers of climate change (i.e., who gets longer growing seasons compared to who suffers drought). Füssel (2010) and Smith, Desai, Rogers, and Houghton (2013) analyze the "double inequity" between responsibility for climate change (large industrialized emitters) and vulnerability to it (small developing economies). Eriksen *et al.* (2011) assess sustainable and unsustainable adaptation, honing in on the consequences of adaptation policies and measures for other sustainable development goals, or the contested politics of adaptation in practice (Eriksen *et al.*, 2015). Wilbanks *et al.* (2003), Wilbanks (2005), Tol (2005), and Klein, Lisa, Schipper, and Dessai (2005) examine tradeoffs between mitigation (stopping emissions) and adaptation (coping with consequences). Adger, Benjaminsen, Brown, and Svarstad (2001) and Bankoff (2001) investigate climate change and adaptation as a discourse, what Taylor (2014: 3) calls an "array of discursive coordinates and institutional practices" that serves to homogenize perspectives and diminish the autonomy of outsiders. What is missing is a more synthetic conceptual approach that integrates these themes across multiple spatial dimensions (micro, meso, macro) as well as multiple social dimensions (politics, markets and the economy, the natural environment, and local practices and culture) and multiple themes (maladaptation, tradeoffs, vulnerability, discourse). Much previous research has only attempted to untangle these separate threads sporadically; here, a conceptual framework is presented that tries to integrate them.

Third, and lastly, the study seeks to *challenge modes of participation* in community-based adaptation schemes. Islam and Nursey-Bray (2017) write, for example, that communities need extended involvement in stakeholder consultations about adaptation, they necessitate a "greater voice." Rahman, Sadath, and Giessen (2016) write that community-based forest programs in Bangladesh are "becoming more important over time" and need to better empower lower level community actors. Although community participation offers a valid option to counter exclusion and the dominant interests of some stakeholders, this paper suggests that it can in some situations be detrimental to the efficacy of an adaptation project. In Bangladesh, some of the most pernicious sets of consequences do not arise from the forces of global capitalism or neoliberalism. While these landscape pressures do play their role, instead it is local actors—community leaders, criminals, state officials, businesspersons, political elites—who perpetuate classism, racism, elitism, and chronic poverty.

The disutility of local processes in community climate change adaptation efforts has been documented in other countries. For example, in Burkina Faso, livelihood diversification programs seeking to bolster resilience have instead fallen victim to predatory marketers who were able to buy livestock at low prices from distressed farmers only to resell them at great profit in other areas (Adger, Paavola, & Huq, 2006). The net effect has been to trap poor households in a vicious cycle of borrowing, pawning, and mortgaging of crops (Roncoli, Ingram, & Kirshen, 2001). In Kenya, some adaptation projects have strengthened the position and power of local herders who resorted to violence and extortion in their negotiations (Eriksen & Lind, 2009). In Ghana, some adaptation projects have been primarily directed at satisfying the desires of men at the expense of a greater workload for women (Carr, 2008). In Malawi, village leaders decided to implement particular measures—such as flood defenses—only for their own cassava gardens (Barrett, 2013). In Pakistan, some flood recovery efforts have only served to further marginalize rural, agrarian land holders. Recovery interventions became an "exercise in power" that enabled dominant social classes to "consolidate their position within the rural hierarchy," excluding poorer communities in the process (Taylor, 2014). The end result has been greater levels of debt among the poor as well as loss of control of land and access to water.

These examples all show how local political ecology elements can be just as influential as national or global forces in creating inequitable or unjust outcomes—a story that is even more amplified in Bangladesh. If it is true that some stakeholders actively seek to enclose, exclude, encroach, and entrench, or if their inclusion indirectly contributes to these processes, than their involvement serves to fragment and subvert the objectives of adaptation. This demands that we refocus the discussion about stakeholders and community involvement away from quantity (more in some cases may not be better), to quality, so that the qualitative goals and interests of stakeholders can be revealed. Greater "participation" may not always produce desirable results.

2. Case selection, research methods, and conceptual approach

Bangladesh was selected as a case study due to its extreme vulnerability to climate related impacts. Most of Bangladesh lies in the delta of three of the largest rivers in the world: the Ganges, the Brahmaputra, and the Meghna, or GBM, shown in Figure 1. These rivers have a combined peak discharge of 180,000 cubic meters per second during the flood season, the second highest in the world after the Amazon, and carry about two billion tons of sediment each year (Mirza, 2002). Bangladesh is at risk not only to flooding and tidal inundation on the coasts, but also advanced melting of the Indian and Nepali Himalayan glaciers. This effectively means

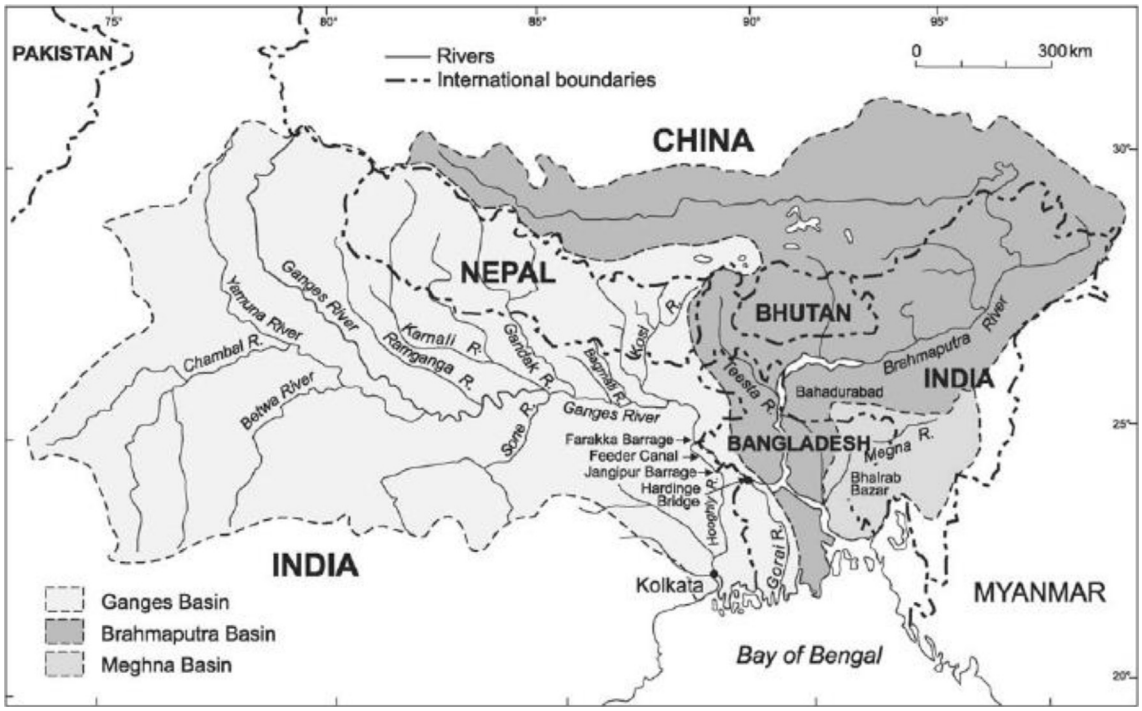

Fig. 1. The river systems and geographic location of Bangladesh. *Source:* Modified from Mirza, 2002.

that the country is hit on "both geographic sides" as well as during "both seasons;" climate change risks disrupting natural cycles of rainfall and snowpack on the Tibetan Plateau, which feeds Bangladesh's major rivers, and also increasing flooding, saltwater intrusion, and storm surges on the coastal belt (Belt, 2011). Moreover, climate change is creating excess rain during the monsoon season, and inducing a shortage of it during the winter drought.

Further compounding matters, the topography of the country is low and flat. Two-thirds of its critical infrastructure is less than 5 meters above sea level and is therefore susceptible to naturally occurring river and rainwater flooding and, in lower lying coastal areas, to tidal flooding during storms. Indeed, one study documented that Bangladesh is perpetually at risk to four distinct types of flooding (Mirza, 2002): *flash floods* which occur from rapid runoff of rainwater in hilly regions; *riverine floods* which result when the GBM rivers or their tributaries, which tend to rise and fall slowly over a ten to twenty day cycle, simultaneously reach their peaks; *rain floods* due to high intensity local rainfall during the monsoon season; and *storm surge floods* caused by tropical storms and cyclones which affect tidal flats and low-lying islands.

Once every four to five years, severe flooding wreaks substantial damage to infrastructure, housing, agriculture, and livelihood (Government of Bangladesh 2005, 2009). A severe tropical cyclone also hits Bangladesh, on average, every 3 years resulting in extensive damage to houses, livestock, and human health. Indeed, Bangladesh was struck by 154 cyclones from 1877 to 1995, a rate of more than one major cyclone per year, and also subject to 174 separate natural disasters from 1974 to 2003 (Reid, Simms, & Johnson, 2007). A severe flood in 2007 inundated 42% of the country's land area (62,300 square kilometers), caused 1,110 deaths, submerged 2.1 million hectares of cropland, destroyed 85,000 homes, damaged 31,000 km of roads, affected 14 million people, and induced $1.1 billion in damages (Dasgupta *et al.*, 2010). To put the damage in perspective, $1.2 billion is equal to all public debt listed by the government at that time.

Disturbingly, such floods and natural disasters are projected to get worse over the next few decades (Dasgupta *et al.*, 2010: 4). Temperature increases of 1–3 °C by 2050 will create problems associated with water: too much of it during the monsoon seasons, and too little of it during the winter. Temperature increases will likely raise sea levels; increase river water levels, water logging, erosion, and flooding during the monsoon season; and exacerbate salt water intrusion and shortages of water for irrigation and agriculture during the winter (Ahmed & Alam, 2010). Agrawala, Ota, Ahmed, Smith, and van Aalst (2003) anticipate four primary negative changes in climate and precipitation: accelerated glacier melting from increased runoff from the neighboring Himalayas, increased rainfall during the monsoon season, sea level rise leading to flooding under ambient conditions and severe flooding during storm conditions, and increased frequency and intensity of cyclones. Every area in Bangladesh is prone to at least one of these four negative changes. A study of 136 global cities concluded that the two likely to witness the greatest proportional increase in people exposed to climate extremes by the year 2017 were Dhaka and Chittagong, both in Bangladesh (Nicholls *et al.*, 2007). Table 1 shows how climate change affects virtually every area of social, political, or economic activity in Bangladesh. Taken collectively, these factors combine to make Bangladesh exceptionally exposed to the impacts of climate change.

Methodologically, to examine climate change adaptation in Bangladesh, the study relies on two sources of data: twenty semi-structured research interviews and data synthesized from a subsequent literature review. Serial interviews were conducted in 2010 and 2015 as part of a research project investigating Bangladeshi climate change adaptation efforts being implemented under the Least Developed Countries Fund (Sovacool, Tan-Mullins, Ockwell, & Newell, 2017; Sovacool, Linner, & Klein. 2017). Admittedly, the focus of these interviews was not political ecology or community vulnerability directly. Instead, the interviews related to better understanding the benefits of, barriers to, and recommendations for enhancing resilience through coastal afforestation programs in Bangladesh being funded by international donors.

However, one of the recurring interview questions asked explicitly about implementation challenges, especially those related to

Table 1
Areas and sectors vulnerable to climate change in Bangladesh

Climate & related elements	Critical vulnerable areas	Most impacted sectors
Temperature Rise and Drought	North West	Agriculture (crops, livestock, fisheries), water, electricity supply, health
Sea Level Rise and Salinity Intrusion	Coastal Areas, Islands	Agriculture (crop, fisheries, livestock), water (water logging, drinking water), human settlements, electricity supply, health
Floods	Central Region, North East Region, *Char* Land	Agriculture (crops, fisheries, livestock), water (urban, industry), infrastructure, human settlement, health, energy
Cyclone and Storm Surge	Coastal and Marine Zone	Marine fishing, infrastructure, human settlement, life and property
Drainage Congestion	Coastal Area, South West, Urban	Water (navigation), agriculture (crops)

Source: Adapted from Government of Bangladesh (2005).

Table 2
Summary data for research interviews ($n = 20$)

Date	Institution	Location	Number of interviews
June 2010	Bangladesh Forestry Department	Dhaka, Bangladesh	3
	Bangladesh Forestry Department	Noakhali, Bangladesh	1
	Bangladesh Forestry Department	Cox's Bazaar, Bangladesh	1
	Bangladesh Forest Research Institute	Chittagong, Bangladesh	2
	Bangladesh Ministry of Environment and Forests	Dhaka, Bangladesh	1
	Bangladesh Center for Advanced Studies	Dhaka, Bangladesh	1
	United Nations Development Program Bangladesh	Dhaka, Bangladesh	1
	United Nations Development Program Bangladesh	Cox's Bazaar, Bangladesh	1
	Hatiya Island Community	Noakhali, Bangladesh	1
	Anwara Upazila Community	Raipur Union, Bangladesh	1
	Cox's Bazaar Community	Cox's Bazaar, Bangladesh	1
	Moheshkhali Village Community	Cox's Bazaar, Bangladesh	1
January 2015	Bangladesh Forestry Department	Dhaka, Bangladesh	2
	Bangladesh Forest Research Institute	Chittagong, Bangladesh	1
	Bangladesh Ministry of Environment	Dhaka, Bangladesh	2
Total			20

Source: Author.

communities and households. Moreover, the interview process included community leaders themselves as participants across the locations of Chittagong, Cox's Bazaar, Dhaka, Noakhali, and Raipur. Strikingly, across the full sample of twenty interviews, issues of vulnerability, poverty, equality, or gender were mentioned in 12, or 60%. Participants were also asked to recommend additional reading, much of which formed the literature review of both popular and academic sources on the topic of adaptation in Bangladesh that form the basis for the rest of the analysis. Many of these sources are fairly recent, but whenever they were more than ten years old, the author conducted a series of supplemental literature reviews looking to triangulate specific claims. Thus, the research interviews were primarily utilized as a scoping exercise, i.e., not for offering direct quotes, but instead as a conduit for identifying themes and the literature review. Table 2 provides an overview of the interviews disaggregated by time, institution, and location.

To filter these data from the interviews and literature review, and to assess the dynamics of Bangladeshi adaptation efforts, this study draws from a conceptual approach loosely known as *political ecology*. In its broadest sense, this field focuses on how power relations and structural inequalities become linked with human processes which degrade the natural environment (Wolf, 1972). Biersack and Greenberg (2006) argue that political ecology refers to the "culture of production, distribution, and exchange" within the socio-environmental system. Watts (2000) suggests that political ecology deals with "access and control over resources and their implications for environmental health and sustainable livelihoods." Bryant and Bailey (1997: 28–29) write that political ecologists generally accept the idea that "costs and benefits associated with environmental change are for the most part distributed among actors unequally" which serves to reinforce, or at times reduce, existing social and economic inequity. Robbins (2004: 20) contends that political ecology research "tends to reveal winners and losers, hidden costs, and the differential power that produces social and environmental outcomes." Although there is great diversity and variation with approaches and terminologies, political ecology has methodologies and applications similar to those utilized in political economy (Hoogvelt, 1987), environmental geography (McCarthy, 2009), neo-Marxism (Harvey, 2003), peasant studies (White, Borras, Hall, Scoones, & Wolford, 2012), and critical agrarian studies (O'Laughlin *et al.*, 2013).

Sovacool, Linnér, and Goodsite (2015) and Sovacool and Linnér (2015) apply political ecology (and economy) concepts to climate change adaptation specifically. Their framework, which is utilized in this study, suggests that adaptation projects must beware of four intersecting processes that can lower their efficacy: enclosure, exclusion, encroachment, and entrenchment. "Enclosure" refers to when an adaptation project transfers a public or social asset into private hands, or expands the role and authority of a private actor into a formerly public sphere. It relates in part to how private institutions, especially corporate actors, intensify their efforts to penetrate into more remote or peripheral areas (markets, geographic territories) from which they can derive revenue. "Exclusion" often occurs in tandem with enclosure, and it refers to when an adaptation project excludes or displaces a particular group of stakeholders or limits access to resources related to due process, fairness, and procedural justice. The process of exclusion enables resources to be appropriated or consolidated by state authorities, private firms, or social elites. "Encroachment" refers to when adaptation projects degrade the environment, interfere with ecosystem services provision, intrude upon biodiversity conservation zones such as protected areas and national parks, or counteract climate change

Table 3
Summary of the processes of enclosure, exclusion, encroachment, and entrenchment

Process	Dimension	Description	Sub-processes	Disciplines
Enclosure	Economic	Capturing resources or authority	Territorial accumulation, privatization, market stretching, parallel bureaucratization, land grabbing	Political economy, environmental geography, public policy, neo-Marxism, critical agrarian studies, peasant studies
Exclusion	Political	Marginalizing stakeholders	Dispossession, accumulation by dispossession, tyranny	Political ecology, climate policy, development studies
Encroachment	Ecological	Damaging the environment	Commodification, subordination, forum shopping	Ecology, environmental science, biodiversity conservation, consumption studies
Entrenchment	Social	Worsening social inequality	Comparative advantage, elite capture	Welfare economics, environmental justice, climate justice, gender studies

Source: Modified from Sovacool and Linnér (2015).

mitigation efforts by involving the emission (embodied, or direct) of greenhouse gases. Adaptation can, because it is primarily concerned with building human resilience, undermine the conservation of biodiversity or other aspects of environmental quality. "Entrenchment" refers to when an adaptation project aggravates vulnerability or the disempowerment of women, the chronically poor, and/or other minority groups. It "entrenches" inequality by interfering with egalitarian systems of distribution, or by further concentrating wealth within a community or transferring risk. Table 3 summarizes these processes, and shows how they criss-cross economic, political, ecological, and social dimensions as well as various sub-processes and academic conceptualizations.

3. Results: exposing the political ecology of Bangladeshi adaptation

Because of Bangladesh's extraordinary susceptibility to climate change, the Government of Bangladesh, with the support of development partners and private actors, has invested billions of dollars over the past few decades to manage risks. These investments have included flood management schemes, coastal polders, cyclone and flood shelters, and the raising of roads and highways above flood levels (Government of Bangladesh, 2009). However, as a response to the country's increased vulnerability and the severity of cyclone *Sidr* in 2007, the government—for the first time—developed and implemented an integrated climate change strategy and action plan, based on its National Adaptation Program of Action (NAPA), in 2008. A local fund of $100 million was established exclusively for local climate change efforts.

Currently, the Ministry of Environment and Forests (MOEF) is tasked with monitoring and managing climate change affairs. The government has established an inter-ministerial committee on climate change, headed by MOEF, comprised of representatives from relevant government ministries and departments as well as key nongovernmental organizations and research institutions. The Department of Environment, under MOEF, has also set up a Climate Change Cell to act as Secretariat for climate change related work within the government. There is also a National Environment Committee, chaired by the Prime Minister and with representation from Members of Parliament as well as government and civil society. To coordinate these many actors, the national climate change adaptation plan attempts to implement a "pro-poor climate change management" strategy, prioritizing adaptation and disaster risk reduction. It also aims to address national concerns with respect to climate change, including food security, social protection and health, comprehensive disaster management, infrastructure, research and knowledge management, mitigation and low carbon development, and capacity building and institutional strengthening (Rawlani & Sovacool, 2011).

The centerpiece of these efforts is the country's NAPA. NAPAs are documents registered with the United Nations Framework Convention on Climate Change (UNFCCC) detailing the urgent and immediate adaptation needs of least developed countries. They are intended to offer peer-reviewed sources of information that provide an objective assessment of ranked climate change adaptation needs and vulnerabilities, as well as sector-specific costs and benefits. Bangladesh's NAPA, in particular, calls for an integrated set of fifteen specific adaptive measures, with the following five ranked in order of importance (Government of Bangladesh, 2005):

1. Coastal afforestation
2. Expansion of drinking water supply systems
3. Land water zoning and better water management
4. Improved emergency and disaster preparedness systems
5. Construction of flood shelters

The primary actor in charge of the NAPA, the MOEF, notes that it generated this list of prioritized actions after screening more than 40 different options and consulting with more than 100 stakeholders through the UNFCCC guided process.

Though these five efforts appear sound in theory or principle, in practice they succumb, in part or in whole, to four political ecology processes.

(a) Enclosure: elite capture and land grabbing

Adaptation projects intended to help coastal and predominately poor populations have instead, at times, been plagued by land predation and land grabbing. *Khas* (public) and *char* (coastal island) lands are both at risk. To understand the process of enclosure more fully in Bangladesh, it is first important to provide a bit of background on the history of land tenure. Interestingly, the process of land grabbing in Bangladesh is both rural and urban, and it has been characterized as consisting of at least two categories, land seizure and land denial, and two processes, *ex situ* and *in situ* displacement.

For instance, many rural riverine and coastal sediment regions, constantly shifting islands called *char* lands, are "contested sites ripe for power plays that uproot small producers on their rich alluvial soils" (Feldman & Geisler, 2012). Many urban lands are captured by elites who use corrupted public servants, the military, and even gangs carrying bamboo sticks to forcibly coerce small land owners to relinquish titles to their property. When an area already owned or in possession of a group is taken over by others, it is known as land seizure. When a group is prevented from acquiring or accessing land to which it is entitled, it is known as land denial (Adnan, 2013). Lastly, *ex situ* displacement is a process whereby people are directly and forcibly removed from their land; *in situ* displacement is when struggles for or regulation of land indirectly leads to expulsion, such as through higher prices or changes in the law (Feldman & Geisler, 2011).

Amazingly, in Bangladesh multiple actors are engaged in both land seizure and denial. As Adnan (2010) documented:

> *The most active agencies have been government departments and forces as well as private interest groups inclusive of commercial land dealers and speculators, political power holders, and civil and military officials in their personal capacities. In some parts of the country, land grabbing has been driven by socio-political factors related to sub-national political and ethnic conflicts.*

Thus, many actors have been quite effective at preventing many Bangladeshis from owning any type of land. One study estimated that roughly half of the rural population, and three-quarters of the country's total population, are landless or hold such a small amount of land that they cannot cultivate crops (Feldman & Geisler, 2012). Another study projects that of all public land declared or set aside for its intended users, such as poor peasants or indigenous communities, only 11.5% has been effectively or legitimately disbursed (Shamsuddoha, Ullah, & Shahjahan, 2014). As a joint report from the Human Development Research Centre and the Association for Land Reform and Development warned, "Bangladesh has a sizeable population of indigenous communities ... [who] are losing their lands gradually because of lack of proper documentation, official records, and grabbing by others" (Barkat *et al.*, 2007). That same study also estimated that only 5% of fishing areas have been leased to poor fishers, with the rest (95%) going to "waterbody-grabbers." The International Institute for Environment and Development (Quan & Dyer, 2008) revealed that "large numbers of Bangladeshis suffer landlessness, and despite land reform legislation and the abolition of intermediary landlords, land distribution has become more unequal in recent years, as a result of substantial problems of poor governance and corruption in the management of public land". Climate change, perhaps understandably, will only exacerbate the situation, especially for *char* lands, which can disappear temporarily or permanently or reappear due to alterations in river flow, storm surge, or sea level rise.

Unfortunately, adaptation projects themselves can become conduits for enclosure and land grabbing. Perhaps the most direct link concerns the country's attempts to promote afforestation. In addition to being part of the measures covered by Bangladesh's NAPA, these actions also fall under a Coastal Development Strategy (CDS), the "lynchpin" of Bangladesh's Integrated Coastal Zone Management process, which is an attempt to "optimize the use of coastal land" to reduce the risks of climate change (Islam, 2006a). Though well intentioned, the CDS, which was implemented from 2006 to 2010, was criticized for increasing demand for land since it decreased the availability of "protected" property for agriculture. Moreover, property falling under the CDS was still subject to the usual government distribution of *char* lands, and "tyrants" and "mostly rich" people "illegally grabbed" the land without compensation and then excluded others from access (Rashid, 2014).

Further undermining the success of the CDS, concerns related to climate change adaptation were not mainstreamed within respective sectoral planning institutions. As a result, the victims of climate change were underserved by their weak government. As Rashid (2013) writes:

> *Core targets of Sixth Five Year Plan (2011–15) of Bangladesh have been set in the context of Vision 2021. This plan acknowledges that climate-induced coastal submergence will be one of the major causes of population displacement. Therefore, effective steps must be explored and adopted in collaboration with the international community within the Sixth Plan period to mitigate problems. This plan regretfully mentions that the poor have very little access to government land like char lands, khas lands, water bodies etc. There are land laws and policies to allot such land to the poor and the landless, but in actual allocation, the interest of the poor is rarely preserved. Though this plan has set some project terms, such as, rehabilitation of climate victim, char development and settlement; implementation of such initiatives are very slow and may take longer to reach for displaced people to access.*

Poor governance, where the government is aligned with wealthy elites in facilitating land grabs explains, in part, why after the CDS ended, coastal villagers reported no major increase in resilience or reduction in poverty. Oftentimes, people in *char* areas also underwent not one but several related rounds of displacement or dispossession (Paul & Islam, 2015).

Other interactions between climate change adaptation and land grabbing are less direct, but no less potent. Although these do not always correspond to climate change adaptation measures, efforts intended to boost agricultural output or lower poverty have given rise to intensified land predation by elite members of Bangladeshi society. As Quan and Dyer (2008) explained:

> *While the complex bureaucratic procedures for land allocation are already inaccessible to the landless, spontaneous land grabs occur before official surveys can take place. Land grabs of char land are frequently organized by powerful landlords (jotdars) under a neo-feudal system using dependent peasants (lathiyals), frequently people made landless by flooding, who may be formed into "cooperatives" registered under the patronage of the jotdars and given preferential treatment in subsequent land allocation by the landlord.*

In sum, elites can use the process of climate change, and their knowledge about where adaptation projects will be implemented, to enclose upon land that they hope will be valuable. Some well-connected stakeholders are able to use government divestiture of land for climate change projects as a mechanism to "gobble up" property and custodial rights (Raihan, Fatehin, & Haque, 2009).

Despairingly, once elites have grabbed land, they tend to hold onto it with a tight fist, backed with violence and even financial brokers and members of the court. After land is claimed, land grabbing groups frequently hire their own small militia or police force to establish security and tenure over their land. These *lathials*, literally "bamboo stick-wielders," can remain on the property over the course of years to challenge any attempts at reclamation (Crow & Murshid, 1994). In severe instances, they can kill protestors of activists (Kotikalapudi, 2016). As time passes, claims for formal property rights gain credibility, and ownership is enforced by the courts—meaning physical force and coercion are no longer needed. Landholders will often rent out their newly acquired land to other poor farmers or sharecroppers who come to depend on it for their livelihood (Lein, 2009)—a perverse and perhaps ironic twist of fate. People, even the villagers themselves who might have been initially displaced, come to accept the land grab as legitimate. Similar systems of patronage—where bandits, criminals, or public officials seize land and then use violence or force to keep it until it slowly becomes normalized as "theirs"—have also been documented in Bangladeshi forests (Adnan, 2010) and the securing of property for roads (Kaida & Miah, 2015).

(b) Exclusion: majoritarian and authoritarian decision-making processes

We see the process of exclusion also affecting multiple dimensions of climate change adaptation in Bangladesh, ranging from exclusionary forms of planning or implementation at the national scale to elite domination at the community scale.

At the national scale, the preparation of key climate documents and the collection of data on climate change have, in some instances, been elitist and exclusionary. For instance, the Bangladeshi NAPA process included economists and scientists as well as

government officials, but not representatives from the most vulnerable groups, their professional associations, and civil society organizations (Huq & Khan, 2008). Authorities have historically refused to prosecute or pursue criminal charges for the land grabbing activities mentioned above, dismissing claims from victims as frivolous and limiting access to legal recourse (Roy, 2000). Furthermore, though *char* water bodies are an important resource for fishers, national policies have historically excluded *char* dwellers from land auctions, giving elites privileged access (Quan & Dyer, 2008).

On the implementation side, ethnic or religious minorities and women have been excluded from decision-making, even when communities try to implement components of the NAPA. To those who have lived in Bangladesh, this might come as no surprise, given that the country remains elitist in its local political and economic structures, and heavily patriarchal in social structure (Kabeer, 2011). Climate change actions in Bangladesh do not enter neutral territory. Instead, one study cautioned that "the archetypal situation in today's Bangladesh villages is elite repression and non-elite compliance;" that is, local elites come to dominate others and utilize resources to retain their positions of power (Blair, 2005). In some parts of Bangladesh, such as *char* lands or along rivers and coasts, the system of relations between landlords and peasants has historically operated in a feudal fashion, where "the local *talukdars* (independent proprietors) and *jotedars* (superior tenure holders), acting as power bosses, use their patron-tied dependents as *lathiyals* to organize violent land conflict" (Zaman, 1991). The poor and powerless, in other words, all too often have little to no voice in village or community decisions of importance (Afroz, Cramb, & Grünbühel, 2016; Santos, Fletschner, Savath, & Peterman, 2014).

A final type of exclusion is often both ethnic and sexist: social customs in Bangladesh dictate that members of the land holding class, mostly upper caste Hindu women, refrain from manual labor. That is, they "almost never work in the fields" (Sarwar, Islam, & Monzoor, 2007). Instead, it is lower caste men that do the bulk of physical work, especially in *char* and riverbank communities where women are not permitted to work outside the home (Alam, Alam, Mushtaq, & Clarke, 2017). This has grave implications for community-based adaptation schemes because it suggests that much of the physical effort of digging canals, erecting flood levees, and planting crops will be done by low-wage laborers with few political and social rights or, perversely, access to the fruit of their labor when completed.

(c) Encroachment: deforestation and industrial degradation of the commons

Because of Bangladesh's heightened vulnerability to climate change, the land use impacts from its adaptation projects can become quite large, leading to encroachment upon other predefined uses relating to physical infrastructure, *char* land, forests, farms, and other public commons. In some instances, this also intensifies environmental degradation.

The most significant, capital-intensive intervention has focused on the erection of polders, designed to provide protection against storm surges, flooding, and tidal intrusion. A national Coastal Embankment Project has existed since the 1960s, and it constructed a staggering 5,100 km of embankments and sea dikes to form 123 polders protecting 1.5 million hectares of land. When these polders began to need retrofitting and repair due to greater intensity and frequency of storms, and drainage congestion problems, a Coastal Embankment Rehabilitation Project upgraded existing infrastructure and then extended it (Islam, 2006b). More recently, in 2013 the World Bank launched the $400 million Coastal Embankment Improvement Project, intended to rehabilitate 600 km of embankments in 17 polders in six coastal districts—Bagerhat, Khulna, Satkhira, Barguna, Patuakhali, and Pirojpur—in order to protect 760,000 people living within the polder boundaries.

The Bangladesh Water Development Board (BWDB) currently manages an intricate network of 9,943 km of embankments, 5,111 km of drainage canals, and about 14,000 flood control regulating structures with a total cost of about $2.7 billion (Dasgupta *et al.*, 2010). Perhaps obviously, these types of efforts encroach upon private uses of land. The Coastal Embankment Improvement Project, merely an upgrading of embankments over the course of 2013–20, is expected to displace more than 6,200 households physically or economically, destroy more than 2,000 businesses, damage 1,315 agricultural plots, and force the closure of 184 educational and religious buildings (World Bank, 2013). Other efforts from the Local Government and Engineering Department, BWDB, and Barind Multipurpose Development Authority attempting to increase irrigation facilities for agriculture have stressed and rapidly depleted groundwater levels (Islam & Nursey-Bray, 2017).

A secondary problem is that these infrastructural measures provide unequal protection. As Feldman and Geisler (2011: 7) write:

> *For several decades the Government of Bangladesh has sought to stabilize such lands by constructing polders and flood control structures, projects largely supported by the donor community. But, under these schemes as well, the benefits often accrue to the more wealthy and secure members of the community, including through the corruption that accompanies their very construction.*

Put another way, the construction or rehabilitation of climate-proofing infrastructure has encroached frequently upon the land held by poor, marginalized coastal inhabitants and protected wealthier stakeholders further along the coast. Its construction also siphons off resources, through corruption, to workers and laborers associated with local elites.

Other encroachment is related to the protection of *char* land and forests. For example, according to national land use policy, as soon as coastal *char* land is located, it is handed over to the Forestry Department, which serves as its custodian for at least 20 years. Rather than circulate this land back to people, mangrove forests are planted as part of a coastal protection measure. Only after accretion and consolidation of silt intensifies beyond a certain point, often taking years or even a decade, is the area behind the mangrove belt converted into land for human settlement (Islam, 2006b). Similarly, a national Costal Afforestation Scheme ran for more than three decades and placed roughly 35,000 hectares of forest plantations under national protection as part of a "Coastal Green Belt," excluding local villagers or communities from cultivating the land so as not to compromise its ecological integrity (Rahman & Rahman, 2015). In tandem, a National Land Use Policy intends to bring one-quarter of all land across the country under forest cover and advocates conservation of existing forested parks, including the Sundarbans (Quan & Dyer, 2008).

A final type of encroachment relates to industrial farming, promoted by the government as a measure to build economic development and resilience among coastal zones. The government launched the *Chingri Mahal*, or shrimp zone rules, in 1992 in an effort to lure foreign investment and generate "high economic returns" (Kartiki, 2011). These rules were followed more than a decade later by the Coastal Zone Policy in 2005 and a Coastal Development Strategy in 2006. These latter efforts sought "to create conditions, in which the reduction of poverty, development of sustainable livelihoods and the integration of the coastal zone into national processes can take place" (Islam, 2006b). More specifically, the top two objectives of these two policies were to "promote economic growth" and to enhance "basic needs and opportunities for livelihoods."

Unfortunately, the implementation of these plans has rested upon the establishment of large-scale industrial enterprises such as shrimp farming. Such activities have transformed previously public agricultural or *khas* lands into sites of industrial output owned by national and, at times, transnational corporations. Part of this encroachment is about integrating "smallholder agriculture" into global commodity chains (Adnan, 2010); part is about boosting export earnings and attracting foreign direct investment (Adnan, 2013).

Regardless of their intended purposes, the shrimp zone and coastal development policies have had detrimental environmental and socioeconomic effects. Deb and Ferreira (2016) argue that shrimp farming has become "the major and perhaps most detrimental" driver behind the rapid deforestation of mangroves in Bangladesh, especially the Sunderban mangrove ecosystem, the largest in the world, and a significant environmental barrier against storm surge. Over the longer term, industrial activities such as shrimp framing could place the entire Sunderban ecosystem at the risk of collapse (Ilman, Dargusch, Dart, & Onrizal, 2016; Sarker, Reeve, Thompson, Paul, & Matthiopoulos, 2016). Other adverse environmental impacts to shrimp farming include salinity intrusion, chemical use and pollution of waterways, and prodigious volumes of brackish water (Afroz & Alam, 2013). Socioeconomically, the policies have prioritized allotment of state lands into private hands. As one study explains, "while the erstwhile priority given to poor peasants continued to be nominally kept in the books, wealthy interest groups became entitled to claim priority in land allotment by invoking the official rules for promotion of shrimp farming" (Adnan, 2013). Consider the situation at Polder 23, a 5,800 hectare size polder in Khulna's Paikgacha *Upazilla* (sub-district), where 84% of residents are landless as a result of the expansion of commercial shrimp farms. As Paprocki and Cons (2014) write:

> *Prior to the incursion of shrimp into the polder, residents claim that it was possible even for sharecroppers and day laborers to achieve household self-sufficiency by combining wage labor with farming on the polder's khas (common) land. Now, the majority of land within the polder, including khas land, has been overrun with shrimp. As a result, residents report not just a decline in the availability of nutritious foods, but a shortage of labor opportunities, an inability to pay the fees necessary for sending children to school and a marked increase in indebtedness both to local moneylenders and to microcredit organizations.*

When asked how they felt about the affect industrial shrimp aquaculture had on their community, villagers used words such as *dhongsho*, *bilupto*, *shesh* ("destroyed," "extinct," and "finished"). Afroz and Alam (2013) contend that the "chain of tenured hierarchy" resulting from shrimp farming has increased leasing fees "beyond the reach of local people" to the point that it has even defeated the original objectives of the coastal development policies.

(d) Entrenchment: Community disempowerment and chronic poverty

A final political ecology dimension to adaptation in Bangladesh is entrenchment, the aggravation of disempowerment or increased inequality across or within communities. Like our other factors, this one also has complex linkages and affects, but coping strategies for climate change are entangled with existing class and ethnic hierarchies that not only disseminate the benefits of adaptation unevenly, but trap many of the poor, powerless, and displaced into a dangerous patrimonial system of insecurity and violence.

Firstly, community coping strategies can worsen gender inequality. One case study of displacement following rapid riverbank erosion in *Char Nalgonda* noted that most families had to relocate five times and some families shifted their homestead 25 times since originally settling in the region (Paprocki & Cons, 2014). This process inequitably distributed work to women. Social customs dictate that women in the household are required to construct and raise the household mud platform (*biti*), make a new oven (*chula*), establish a new garden, and, if desired, build new basic infrastructure such as tubewells and latrines (Lein, 2009). Afroz *et al.* (2016) also found that in community forestry programs, community work was highly stratified by gender.

Beyond gender, issues of class, ethnicity, and village hierarchy come into play (Afroz *et al.*, 2016; Alam *et al.*, 2017). After a severe flood occurs, the typical response from villagers is to seek social and economic support from friends and local institutions before they approach nongovernmental organizations, aid donors, or the government. Given the paucity of state resources in Bangladesh, this makes sense, but it also means that victims become more susceptible to local processes, including profiteering. For instance, one study of refugees from flood and riverbank erosion in Bangladesh found that many villagers had to sell their cattle and household utensils to meet simple needs such as water and food (Karim, 2014). Another examination of land expropriation in Bangladesh noted that many *char* residents had to abandon homestead land, housing materials, crops, cattle, and trees when confronted with a disaster, selling them at cut-rate prices to local marketers (Feldman & Geisler, 2012). A report from the University of Dhaka comments that often after a national or local disaster, "local elites and influential groups take advantage of the situation because local marginalized farmers in many cases are forced into distress selling" (Mamun, 1996). The implication here is that victims can face entrenchment not necessarily by private corporations, but by their own neighbors.

Displaced households lacking savings or property are forced into an even worse situation: they must go into debt, migrate, or starve. One study of coastal hazards and community coping methods in *Hatia*, an island in the Noakhali district, found that those without property, savings, poultry, or livestock—a strong majority—had to take a loan from relatives, or, a more common practice, moneylenders. According to Parvin, Takahashi, and Shaw (2008), those who could not secure loans tended to leave the community in search of jobs in urban areas, usually Chittagong or Dhaka. If a job could not be found, those without access to alternatives were usually "forced to resort to starvation, sometimes only one meal a day, or nothing at all."

Another older assessment of coping strategies in the Brahmaputra-Jamuna floodplain noted, again, that the displaced were dependent upon their kin and local groups for assistance, and in the absence of those, they needed to rely on their friends and relatives, or without those, relocate and starve (Haque & Zaman, 1989). As the authors concluded, "displaced households having no land of their own to resettle, or who cannot expect any material assistance from their equally poor relatives, have very limited choices" and "adjustment to displacement in the active floodplains of Bangladesh has been conditioned historically by social, cultural and political factors."

Sordidly, an elaborate patronage system has arisen to exploit this process of displacement. Many displaced persons seek permission and protection to remain in *char* areas as the dependent of a village faction leader or a locally powerful chief, a *matabba*, or a locally powerful boss (called a *talukdar* during colonial times). These local elites provide necessary support for resettlement—in some cases food and water, in other cases temporary land—because the landless displaced represent historically "a cheap labor pool to work on their land" (Haque & Zaman, 1989). Some of the displaced are also useful as loyal *lathials*, or bamboo-stick-wielding hoodlums promoting the process of enclosure discussed

previously. In some cases, the roles of law enforcement agencies are coopted by local elites and their affiliated political parties.

Such a system, despite its viciousness, seems to be particularly widespread in Bangladesh's most vulnerable areas. Feldman and Geisler (2012) write that:

> *Although the incidence of destitute displacees is quite high in the region, relief and rehabilitation programs are seldom undertaken by national government or nongovernment agencies or by local government offices ... This assistance vacuum and the limited options for displacees brought about an insidious dependence on local patronage systems and set in motion... multi-staged displacement.... Impoverished displacees become a cheap labor pool of sharecroppers and agricultural workers for local talukdars (bosses) and serve, as well, as violence enforcers of land grabbing for one or another local faction. That is, they are transformed into 'readily available lathiyals (clubmen, armed retainers) to organize violent fights when necessary to gain control over newly emergent char land.' This perverse process, turning displacees into displacers, is not an isolated incident.*

According to one older survey, more than 50% of *char* villagers are displaced and serve as landless "dependents" embroiled in seedy patronage networks (Haque & Zaman, 1989). Another study of forced migration in Bangladesh noted that in situations where refugees do not have family or savings, landlords almost always demand agricultural labor, household service, and political support in exchange for a house plot (Indra, 2000).

Life as one of these landless, powerless, displaced people is far from enjoyable, to put it mildly. For instance, Abul Kalam, who used to be a professional fisher, is now a rickshaw puller living with his family of eight in a temporary thatched shack next to the canal of a fishery *ghat* (landing center for boats) (Sovacool & Linnér, 2015: 50–51). He migrated to Chittagong city in 2008 after he lost three acres of land due to the erosion of the Meghna. As he says:

> *I shifted house three times due to erosion. My family members lived on other land after losing assets. Erosion changes everything; our home, livelihood and the society as well. River erosion is the curse for us (Sovacool & Linnér, 2015: 51).*

He has four sons and two daughters. Before their displacement, his eldest son was a day laborer in a village, but now he subsists by skinning fish. Abul's second and third sons, and eldest daughter, dropped out of school and are currently unemployed.

This is not the worst that can happen. Adnan (2010) researched land struggles in the *Noakhali* coastal belt, where landless and displaced peasant squatting on *char* lands is common. As he explains, these people:

> *Faced recurrent violence from rival power-holders in the form of arson, harassment, assault, rape and killings, which were usually linked to threats of eviction from the lands under their occupation. Furthermore, these migrant households were subject to the absolute social power of the banadasyu leaders within their respective domains, who 'promulgated local laws' and used violence and intimidation to exploit and repress them. They had little option but to suffer in silence since they needed the protection of their own banadasyu leader against attacks from rival power-holders seeking to grab their tenuous landholdings.*

In the face of climate change, land tenure and human security for the displaced usually depends upon pledging loyalty to one criminal boss or another. The system of patronage is inescapable. Further, all of the displaced have political value to the *matabba* and *talukdar* as captive voters in local and state elections, ensuring that the mechanisms perpetuate themselves.

4. Discussion: rethinking the politics, ecology, and governance of adaptation

Within Bangladesh, enclosure, exclusion, encroachment, and entrenchment act at multiple sites across various stakeholders. As Table 4 summarizes, the political ecology of adaptation transcends micro, meso, and macro scales with distinct underlying causal factors. At the macro scale, national policies have reoriented efforts toward boosting resilience and enhancing exports and economic development, practices that protect some—notably wealthy land owners and shrimp farm industrialists—but exclude others—notably the landless and displaced peasants. At the meso scale, at the level of cities and communities, we see thugs and bandits roaming the countryside to steal land or appropriate resources, with an eye for which climate change adaptation projects make land more valuable and worth grabbing. At the micro scale, within neighborhoods and households, we see how family members cope with disaster, often by delegating some of the hardest work to women or ethnic minorities, or by taking advantage of distress selling by households that lack savings or property.

There is also a circular or cyclical nature to the interactions among the different political ecology processes. Enclosure and exclusion can lead to encroachment or entrenchment, or vice versa. Afroz *et al.* (2016) note for instance that differences in socio-economic status—patterns of entrenchment—can subordinate and disadvantage community members in decision-making fora—resulting in exclusion. This exclusion can affect broader political ecology dimensions cutting across "representation, participation, and access to natural resources" (Afroz *et al.*, 2016). Exclusion can also facilitate entrenchment, converting vulnerable landless peasants—the displaced—into future perpetuators of displacement as they become incorporated into *lathials*, or held as captive voters who have pledged allegiance to particular factions. Similarly, the local processes facilitating entrenchment, especially the consolidation of wealth and privilege into a community hierarchy, enables a power elite to emerge and engage in the "politics of reputation" or "patronage politics" at higher levels—local elites intermingle with other influential business leaders and political representatives, and come to create a regime that protects their shared interests, perpetuating enclosure. As a result, Mahmud, Ahmed, and

Table 4
The multi-scalar nature of the political ecology of adaptation in Bangladesh

Scale	Political ecology predominately affects	Explanation
Macro: National export zones, industrial clusters, and protected areas	*Khas* land, farms, coastal villages, forests	People become displaced or lose livelihood opportunities in the face of climate-infrastructure, forest conservation areas, waterways, and aquaculture sites
Meso: Cities and regions	Public commons, char areas, hilly agro-ecological regions	Powerful landlords (*jotdars*) utilize a neo-feudal system of dependent peasants (*lathiyals*) to consolidate power and concentrate wealth
Micro: Neighborhoods and households	Family assets, *banadasyu* patronage networks	Moneylenders and community leaders take advantage of disaster victims by forcing them to sell assets at low prices or recruiting them into a patronage system managed by the *matabbar* and *talukdar*

Source: Author.

Mahajan (2008:15) argue that "spoils and privileges are parceled out to different clientele groups as an essential tool of political management" and that "a large part of the bureaucracy is seen to be corrupt and incompetent, which further feeds this vicious cycle of poor governance." The negative political ecology elements of adaptation get institutionalized and systematized.

To be clear, many of the political ecology elements identified are not entirely the result of local forces or factors. Instead, we see actions in Bangladesh connected to global processes such as the funneling of international donor money (e.g., hundreds of millions of dollars from the World Bank) into national infrastructure projects such as polders, embankments, and canals. We witness the desire to attract foreign direct investment driving the expansion of industrial shrimp farms. Most of all, we see a global demand for cheap labor and commodities placing pressure on national systems of Bangladeshi governance, and local systems of village hierarchy and patronage, that place profiteering and accumulation of wealth before the welfare of individuals, particularly the landless and displaced.

Furthermore, because of its political ecology, many of the adaptation interventions undertaken in Bangladesh will require further adaptation. The more than $3 billion placed into the construction or rehabilitation of polders will require costly maintenance and wide-ranging resettlement and relocation plans. Moreover, if sea levels rise beyond the height of these protective measures, they could even trap flood or storm surge water behind them, backfiring and worsening the impacts of climate change. The industrial shrimp farming and export-oriented economic development strategy ostensibly intended to alleviate poverty have damaged river embankments and facilitated the construction of sluices that allow saline water to enter freshwater areas, leading to the intrusion of brackish water that makes cultivation of other crops difficult (Kartiki, 2011). Furthermore, community coping strategies predicated on property and loans can become a stark liability when those assets run out, placing family members in a predatory system where workers pledge economic and political loyalty to clan bosses in exchange for shelter, food, and security.

Lastly, the existence of enclosure, exclusion, encroachment, and entrenchment in some Bangladeshi adaptation measures does not mean that they are always present or even frequently present. Nor does it imply that Bangladesh should abandon its adaptation efforts. There are many adaptation projects that seem to be producing a net social benefit despite the complex Bangladeshi political ecology surrounding them (Ahammad, Nandy, & Husnain, 2013; Chowdhury, 2008; Rawlani & Sovacool, 2011). So, not every adaptation project need perpetuate inequality, exclude others, or enclose and encroach upon people's property or livelihood. Although political ecology processes can at times distort or mold adaptation projects and processes to the interests of dominant stakeholders, they do not necessarily or completely undermine or obfuscate all of the benefits of adaptation. Even the specific critiques raised, some of them quite sobering, are aimed at a target: improving and learning from adaptation's political ecology so that the least vulnerable are helped, and so that benefits and burdens are made visible, and distributed fairly and according to representative processes. Planners and practitioners of adaptation projects need to become more cognizant of the potential for projects to harm others, or admit complicity in the processes of enclosure, exclusion, encroachment, and entrenchment.

5. Conclusions

In sum, this article reveals the political ecology dynamics applied to the study of climate adaptation in practice. Plans that may "look good on paper" can be extremely problematic in implementation contexts. Adaptation efforts need politicized and issues around the political ecology of climate change adaptation in Bangladesh need recognized, let alone managed. The four parallel processes through which adaptation can be coopted—enclosure, exclusion, encroachment, entrenchment—are ultimately detrimental to the goals of equitable development. Such efforts become complicit in changing resource control and capture by state, private sector and local elite actors, as well as increasing inequalities and undermining access to justice. In addition, ecological impacts of adaptation practice can negatively impact sustainability and exacerbate vulnerabilities of marginalized groups to the very sorts processes that they seek to counter and can increase exposure of local populations to a number of additional social and environmental stressors and challenges.

One conclusion arising from this analysis is the necessity of a theoretical lens that is multi-scalar or polycentric. Micro or local dynamics interact with meso or regional pressures in tandem with macro or global trends. Emphasizing only a single scale—say, a household practice, a community action plan, a national policy—ignores and may even obscure the circulation of more complex, deeper political ecology forces. Another conclusion is that the research community needs to conceptualize and develop new adaptation pathways (and, indeed, perhaps developmental pathways) that can avoid these failures in climate change implementation and practice, as well as more nuanced framings of climate change and environmental governance.

The presence and pervasiveness of some of the political ecology elements associated with adaptation—especially the classism, violence, and feudal nature of patronage—should serve as a wakeup call for Bangladeshi planners that they can no longer ignore the broader social and political environment in which they operate. For, while it is true that climate change can be described as a major causal factor creating "descents into poverty" where households succumb to flooding and ill-health (Sen, 2003), our research suggests that community responses, and adaptive measures, can also serve as a lever that forces Bangladeshis to descend and remain trapped in poverty and human insecurity.

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